



July 24, 2003

Air and Radiation Docket
Environmental Protection Agency
Mailcode: 6102T
1200 Pennsylvania Avenue NW
Washington, DC 20460
Attention: Docket ID NO. OAR 2002 0064

RE: Support for EPA Proposal to Approve n propyl bromide and Comments
Pursuant to Section D. Flammability of Protection of Stratospheric Ozone:
Listing of Substitutes for Ozone Depleting Substances - n-Propyl Bromide:
Proposed Rule Federal Register Vol. 68 No. 106, June 3, 2003.

Enviro Tech International, Inc. is the manufacturer of the **EnSolv** Family of Solvents, which are based on n propyl bromide ("nPB"). Since bringing the first nPB based solvent to the market in 1996, our patented **EnSolv** formulations have provided a necessary and successful replacement for ozone depleting substances such as CFC-113, methyl chloroform and HCFC-141b for vapor degreasing, ultrasonic and other precision cleaning applications.

We respectfully request that the following comments regarding the above described Notice of Proposed Rulemaking ("NPR") be entered into Docket ID NO. OAR 2002 0064 and considered in the Final Rulemaking regarding the issues discussed herein.

Enviro Tech supports EPA's overall decision to list n propyl bromide as approved under SNAP after nearly eight years of intense review.

In *Section IV D. Flammability*, EPA states "we do not currently believe" nPB should be restricted because of flammability." We agree that nPB should not be restricted under SNAP on the basis of flammability concerns first, because EPA has no authority under the Clean Air Act to consider restrictions on chemical compounds due to flammability and second, because nPB has been repeatedly shown, when tested under the applicable standards, to have no flash point and is therefore, by all applicable definitions, non-flammable.

As discussed below, flammability is a well understood concept defined in a consistent manner by the Department of Transportation ("DOT"), the Occupational Safety and Health Administration ("OSHA"), voluntary consensus standards bodies such as the National Fire Protection Association ("NFPA"), the American National

Standards Institute (“ANSI”), and the National Paint & Coatings Association (“NPCA”), foreign rules and regulations including those of Canada and the European Union, as well as the United Nations Model Regulations for the Transport of Dangerous Goods, the International Maritime Organization (“IMO”) and the International Air Transport Association (“IATA”) . EPA has consistently deferred to the regulations of DOT and OSHA for the definition of flammable used in its own regulations. “Pure” nPB as well as stabilized nPB solvents such as EnSolv have been determined to be non-flammable pursuant to *all* these sources and regulations

We are concerned because the only evidence EPA sets forth in the NPR in support of its view is merely anecdotal and insufficient to support *any* conclusion. We are concerned that EPA also neglected to include or mention any reference or citation to the documents, statements, information, etc. relied upon as the basis of EPA’s position. Further, we are also concerned that EPA has had scientific and technical data determinative of this issue in its docket since the first SNAP Petition was filed in 1995 and has received additional data throughout its nearly eight year review, yet has all but ignored this data in the NPR.

EPA’s position regarding the flammability of nPB is needlessly unclear, confusing, unsupported and inconsistent with previous EPA positions regarding other SNAP approved compounds with similar characteristics. EPA has cited no actual scientific or technical data which conflicts with or even questions the conclusion that nPB is non-flammable under any of the relevant definitions. EPA should rely on the scientific and technical data (i.e. flash point test data) which shows conclusively that nPB is non-flammable according to all pertinent rules, regulations and definitions and unequivocally state that nPB has no flash point and is therefore non-flammable. As we will discuss, the only proper and scientifically supportable position regarding flammability, and the position that EPA is obligated to take under the law, is that based on relevant scientific and technical scientific and technical data, nPB is non-flammable pursuant to DOT and OSHA regulations as well as standards promulgated by numerous voluntary consensus organizations. At this late date, it is of serious concern that EPA has only now begun to equivocate on an issue which has been well settled for years.

EPA Ignores Scientific and Technical Data Regarding Flammability Which Was Filed in the Docket Since 1995

EPA has had *scientific data* (i.e., flash point test results) in its possession since the first Petition for SNAP approval was filed in 1995 and has received numerous additional flash point test data throughout the nearly eight years this review has been ongoing. In a glaring omission, EPA makes no reference whatsoever to any of this highly relevant scientific and technical data in its discussion of flammability in the NPR.

The documents listed below clearly show that EPA has long had the proper relevant scientific and technical data necessary to determine the flash point of nPB and thus determine whether or not nPB is flammable under applicable regulations:

- 1) SNAP Petition from Albemarle Corp. dated July 15, 1995 - ASTM D56 flash point test conducted by United States Testing Company dated June 13, 1995 which reports that no flash point was found for nPB. A-91-42 VI-D-114. (Exhibit A)
- 2) *Tabulation of Flammability Studies on n propyl bromide*, describes seven flash point tests conducted by independent laboratories according to various ASTM standards which were sponsored by Dead Sea Bromine, Albemarle Corp. and Great Lakes Chemical between 1996 and 1999, all of which found no flash point for nPB. Docket A-2001-07 Doc# II-D-45 (Exhibit B)
- 3) Enviro Tech's SNAP Petition of January, 1996, which included a flash point test from TEI Laboratories which concluded no flash point was found for nPB. A-91-42 VI-D-138 (Exhibit C)

In the NPR, EPA requests commenters to submit specific information concerning the flashpoint of nPB. This request is extremely peculiar in view of the fact that EPA has had the results of many flash point tests from highly respected independent laboratories of both "pure" nPB and stabilized nPB blends actually used in the marketplace on file for years. The timing of this request is also odd considering that this issue was never discussed in any of the number of previous Federal Register publications concerning nPB.¹ The efficacy of this SNAP review must be questioned when EPA calls for information which duplicates scientific data already in the docket, especially where, as is true in this case, EPA does not cite any *actual test data* which contradicts the dearth of information already in the docket which all conclude that nPB has no flash point and is therefore non-flammable by definition.

¹

See Feb 1999 and Dec 2000 Fed Regs

Federal Regulations Define Flammability and Set Forth Applicable Standards for Determining Flammability

Class 3 flammable liquids² are defined by DOT for transportation purposes based on the temperature at which a liquid exhibits a flash point.³ Consistent with DOT, OSHA defines the term “flammable liquid” in essentially the same manner.⁴ OSHA and DOT regulations are also consistent in defining the term “flash point” as “the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite” *when tested by specific methods set forth in the regulations.*⁵

DOT regulations set forth ASTM D56, ASTM D3278, ASTM D3828 or ASTM 93 as the prescribed standards to be used in determining the flash points of liquids.⁶ Likewise, OSHA regulations state that either ASTM D 56, ASTM D93 or ASTM D3728 must be used to determine the flash point of a liquid.⁷

The term “flammable” then, is well understood and defined in a consistent manner by DOT and OSHA. Both Federal agencies base the determination of flammability on the temperature at which a liquid exhibits a flash point. It is well settled then that within the United States, the applicable standards to be used to determine the flash point of a liquid are ASTM D56, ASTM D3278, ASTM D3828, or ASTM 93. It is axiomatic that a liquid which does not exhibit a flash point when tested under the above standards cannot be deemed to be flammable.

EPA Practice is to Defer to DOT and OSHA Definitions of Flammability and EPA is Obligated by Law to Adopt National Consensus Standards

In numerous cases, such as EPA Hazardous Chemical Reporting: Community Right-to-Know regulations⁸, EPA defers to either DOT or OSHA definitions in order to determine whether or not a liquid is flammable. Previous practice by SNAP

² See 49 CFR 173.2

³ 49 CFR 173.120(a)

⁴ 29 CFR 1910.1200(c)

⁵ See 49 CFR 173.120(c)(1) and 29CFR 1910.1200(c).

⁶ 49 CFR 173.120(c)(1) - (3)

⁷ 29 CFR 1920.1200(c) Flashpoint (I) - (iii)

⁸ 40 CFR 370.2 (3) flammable liquids are defined pursuant to OSHA regulation 29 CFR § 1910.1200

evidences this deference to DOT and OSHA regulations: “HCFC-141b ... is nonconductive, nonflammable according to U.S. Department of Transportation specifications”.⁹

Since multiple flash point tests conducted pursuant to the applicable ASTM standards determine that nPB has no flash point, under DOT and OSHA definitions nPB is non-flammable. Since it is common EPA practice to defer to OSHA and DOT definitions when determining whether or not a liquid is “flammable” and especially since previous SNAP reviews have deferred to DOT and OSHA on this subject¹⁰, a conclusive statement that nPB is non-flammable is the only correct and supportable statement that EPA can disseminate on this issue.

Other Laws Mandate Specific EPA Action Which Must Result in EPA Determining nPB to be Non-Flammable

Even without other Federal agency action defining the term “flammable liquids” and even without EPA’s long history of deferring to these regulations, EPA is still obligated under the law to determine nPB to be non-flammable. As EPA well knows, the National Technology Transfer and Advancement Act (“NTTAA”) mandates that EPA “use voluntary consensus standards in regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical.”¹¹

The National Fire Protection Association (“NFPA”), the American National Standards Institute (“ANSI”) as well as the National Paint & Coatings Association (“NPCA”) are all recognized national voluntary consensus organizations as described in NTTAA and all have promulgated national voluntary consensus standards defining the term “flammable liquid”. Not surprisingly, these voluntary consensus standards are consistent with OSHA and DOT regulations. The scientific data EPA already has mandates finding that nPB is non-flammable under each of these national voluntary consensus standards.

“The mission of the international nonprofit NFPA is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating scientifically-based consensus codes and standards, research, training and

⁹ Federal Register Vol. 59 No. 53 March 18, 1994

¹⁰ Id.

¹¹ 68 Fed Reg 106. June 3, 2003 pg 33312. See P.L. 104-133 Section 12(d) and 15 USC 272.

education.”¹² One relevant NFPA standard is NFPA 704¹³, which sets out ASTM flash point tests¹⁴ to be used to determine flash points and define the term “flammable liquid”. NFPA 704 clearly states “if the liquid has no flash point, it is not a flammable liquid.”¹⁵ Likewise, NFPA 30¹⁶ lists the same ASTM standards as NFPA 704 as relevant for determining the flash point of flammable liquids.^{17 18} Under both standards, a flammable liquid is defined in terms of the temperature at which the liquid exhibits a flash point¹⁹.

The Hazard Materials Identification System (“HMIS”) is a national consensus standard published by the NPCA which specifically follows the criteria set forth in NFPA 704 in defining flammability.²⁰ The American National Standards Institute’s national consensus standard ANSI/CMA Z129.1-1994 also defines flammability in terms of flash point and agrees that liquids exhibiting no flash point under relevant test standards are not flammable.

A remarkable degree of consistency exists regarding the definition of a “flammable liquid” between the DOT, OSHA, NCPA, ANSI and NFPA standards. This can be easily seen in Table A.1.7.3 of NFPA 704 (Exhibit L). Although these standards may vary to a small extent as to the exact temperature limit used to

¹² <http://www.nfpa.org/catalog/home/AboutNFPA/index.asp>

¹³ NFPA 704 Standard System for the Identification of the Hazards of Materials for Emergency Response 1996 Edition.

¹⁴ These include ASTM D93, ASTM D92, ASTM D56, ASTM D3828 and ASTM 3278.

¹⁵ NFPA 704 Standard System for the Identification of the Hazards of Materials for Emergency Response 1996 Edition. Appendix C: Flammability pg. 11.

¹⁶ NFPA 30 Flammable and Combustible Liquids Code 2000 Edition NFPA, Quincy, MA. Appendix Sec. A.1.1.1 pg. A 30-75.

¹⁷ NFPA 30, Section 1.7.4.

¹⁸ ASTM D93, ASTM D92, ASTM D56, ASTM D3828 and ASTM 3278

¹⁹ Sec. 1.7.3.2 Flammable Liquid. NFPA 30 Flammable and Combustible Liquids Code 2000 Edition NFPA, Quincy, MA. pg. 30-12.

²⁰ <http://www.paint.org/market/hmis.htm>

define flammability, *they are all consistent to the extent that where no flash point is exhibited, the liquid is considered non-flammable.*

Under the plain language of the NTTAA, there are only two circumstances in which EPA can refuse to adopt national consensus standards and instead promulgate regulations which differ from the consensus standards. First, EPA may refuse to adopt national consensus standards if they are inconsistent with applicable law; but here, the applicable law laid down in DOT and OSHA regulations is in all ways consistent with the NFPA, HMIS and ANSI standards.²¹

EPA may refuse to adopt national consensus standards if to do so would be “otherwise impractical.” In order to be “otherwise impractical”, the national consensus standards must be incapable of being put into practice or use or incapable of dealing sensibly with practical matters.²² The consensus standards have been successfully applied in practical, “every day” use for years. Since all of these voluntary consensus standards are consistent with existing DOT and OSHA regulations, it is impossible to argue that these standards cannot be put into practice or are not a sensible way to deal with a practical issue.

Further, in nearly eight years since receiving the first Petition for SNAP approval for nPB, EPA has not identified any *actual scientific or technical data* which questions or contradicts the results of the multiple ASTM flash point tests showing nPB has no flash point. Therefore, pursuant to the NTTAA, EPA is obligated to use these voluntary consensus standards in regulatory activities.

Since under all applicable standards nPB meets the definition of “non-flammable”, EPA should explicitly state that according to OSHA and DOT regulations and the NFPA, HMIS and ANSI national voluntary consensus standards, n propyl bromide must be considered non-flammable.

²¹ Id. “OSHA stated in the preamble to the 1983 HCS that “Labels prepared in accordance with the NPCA Hazardous Materials Identification System would generally be in compliance with this standard.” OSHA recently confirmed the acceptability of HMIS® as an in-plant hazard communication tool. In the preamble to the 1994 revised HCS, OSHA indicated that this type of system continues to be an acceptable means of complying with the standard.” Other examples abound.

²² Random House Webster’s Dictionary 3rd Edition Balantine Publishing, 1993.

The regulations and national consensus standards discussed above are all well known to anyone with the minimum requisite expertise to discuss the issue of flammability. If EPA is to consistently apply the same standard to nPB as it has to other compounds, EPA must state unequivocally that nPB is non-flammable under all these various standards. Anything less would subject n propyl bromide to a new and distinctly different standard of review. If, on the other hand, EPA is announcing a new standard of review, it should state as much in no uncertain terms.

US Federal Regulations and US Voluntary Consensus Standards Defining Flammability are Consistent with United Nations and Foreign Regulations.

The definition of flammability used by OSHA and DOT is also consistent with that of other governments. Section 2.18(1)(a) of the Canadian Transportation of Dangerous Goods Regulations published in Part II of the Canadian Gazette also defines a flammable liquid in terms of the temperature of the flash point of the substance. Canadian regulations specify the methods in Chapter 2.3 of the United Nations Model Regulations for the Transport of Dangerous Goods are to be used to determine a flash point.

Paragraph 2.3.2. of the UN Model Regulations also defines a flammable liquid in terms of the temperature at which a liquid exhibits a flash point. Paragraph 2.3.3 lists ASTM D3828, D56, D3278 and D93 (and others) as applicable tests to determine a flash point. Similarly, in the European Union, *Directive 67/548/EEC, Annex V, Section A.9 Flash Point, Part A: Methods for the Determination of the Physico-Chemical properties* specifies applicable test methods to determine flammability. These are consistent with DOT and OSHA regulations, as well as with the voluntary consensus standards of the NFPA, NPCA and ANSI, in that a liquid which exhibits no flash point when tested under applicable standards is, by definition, non-flammable.

Further, as noted in a statement from Dead Sea Bromine Group (Exhibit D), the UN Recommendations on the Transport of Dangerous Goods (12th Edition), the International Maritime Organization ("IMO"), the European Road Transportation Regulations ("ADR") and the International Air Transport Association ("IATA") and the US Department of Transportation have been harmonized. The harmonization includes a provision which exempts any member of the class of bromopropanes from regulation as a flammable liquid where it is shown that on the basis of flash point tests, the compound in question does not meet the criteria for a Class 3 flammable liquid. NPB is non-flammable under all these various exemptions.

It can only be concluded that the concept of flammability of liquids is well understood world wide and that liquids which do not exhibit a flash point are considered to be non-flammable. Since the world wide consensus, US statutes, Federal regulations and the standards promulgated by voluntary consensus

standard bodies all agree on this issue, EPA must state unequivocally that nPB is non-flammable.

Flammability Limits Are Not Determinative of Flammability

EPA states that “nPB forms flammable mixtures in air within only a narrow range. All estimates that EPA reviewed fall somewhere within the range of 3.5% – 9%.” This statement is accurate and may be based on the scientific and technical test data in the docket, although that information is not cited in the reference section. In any event, it is well settled that flammability limits are not determinative of the “flammability” of a chemical substance.

NPB shares this characteristic²³ with many SNAP approved compounds which EPA has described as non-flammable.²⁴ Among the approved substitutes for ozone depleting substances are trichloroethylene and methylene chloride, which EPA deemed to be non-flammable. In fact, EPA states that “while the agency generally discourages the use of these chemicals in aerosol applications, they may be necessary in products where non-flammability is a critical characteristic. The Agency encourages formulators of aerosols to restrict their use of chlorinated solvents to products that must be nonflammable.”²⁵ EPA also characterized HCFC141b as nonflammable stating, “HCFC-141b has a number of characteristics that make it a suitable alternative solvent, namely: It is nonconductive,

²³ No flash point but determinable flammable limits in air

²⁴

methyl chloroform	LEL 8	UEL 13 ^A
trichloroethylene	LEL 8	UEL 11 ^A
methylene chloride	LEL 13	UEL 23 ^A
HFE 7200	LEL 210 g/m3	UEL 1070 g/m3 ^B
HCFC-141b	LEL 7.1	UEL 18.6 ^C

A. *Typical Properties of Chlorinated Solvents*
<http://www.hsia.org/properties.htm> July 1, 2003

B. 3M MSDS HFE 7200 Dec. 1, 2000 (Exhibit E)

C. 3M Novec Engineered Fluid HFE-7100 Product Information.
October, 2000 (Exhibit F)

²⁵ Federal Register Vol. 59 No. 53 March 18, 1994

nonflammable according to U.S. Department of Transportation specifications, and evaporates quickly.²⁶

Previous EPA practice has been to, at the very least, accurately describe other SNAP approved compounds with like characteristics as seen in Federal Register / Vol. 65, No. 243 / Monday, December 18, 2000:

- 1) “The flammability range in air is 2.4 – 12.4%. HFE-7200 has no flashpoint.” (pg. 78978)
- 2) “HFC-365mfc has no flash point. The lower and upper flammability limits are 3.8% and 13.3%, respectively.” (pg. 78980).

None of the above compounds are considered flammable by EPA (or DOT, OSHA, NFPA or NPCA for that matter) even though they exhibit upper and lower flammability limits. In fact, NFPA specifically recognizes this characteristic of halogenated hydrocarbons, a class of which nPB is a member, and explicitly *exempts* these compounds from compliance with NFPA 30.²⁷

Additionally, although some SNAP approved compounds such as HFE-7100 or HCFC-4310mee exhibit no flash point or flammability limits as a neat compound, commercial mixtures of these compounds and 1,2 trans dichloroethylene, various alcohols and/or other compounds do exhibit flammable limits in air and are marketed as non-flammable.²⁸

As discussed above, EPA and chemical manufacturers have consistently and correctly deemed substances which exhibit no flash point as non-flammable

²⁶ Id.

²⁷ Sec 1.1.2 This code shall not apply to the following: (3) any liquid that does not have a flash point, which can be flammable under some conditions, such as certain halogenated hydrocarbons. NFPA 30 at 30-9.

²⁸ Kehren, J. *A Comparison of Hydroflouroether and Other Alternative Solvent Cleaning Systems*. 3M Company St. Paul, MN. Datatech; *3M Novec Engineered Fluid HFE-71IPA Hydroflouroether Azeotrope Product Information*. March, 2000; *3M Novec Engineered Fluid HFE-71DA Hydroflouroether Azeotrope Product Information*. October, 2000; DuPont Vertrel CCA Technical Information. November, 2001; http://www.vertrelsolvents.com/product/PS_CCA.html July 1, 2001).

regardless of fact that the substitutes also exhibit flammable limits in air.²⁹ In fact, as discussed above, EPA encourages the use of chlorinated compounds in aerosol applications where non-flammability is *critical*. Yet, despite the fact that EPA has regularly deemed substitutes having the same characteristics to be non-flammable and despite EPA's *encouraging the use* of substitutes with similar characteristics where the use non-flammable compounds is *critical*, EPA appears to be unwilling to treat nPB in a similar manner. Unless through this NPR EPA is announcing a new standard of review for chemical compounds under SNAP, its process is violative of equal protection. If EPA is indeed announcing a new standard of review, it is then to be assumed that all subsequent SNAP reviews, including those coming pursuant to 42 USC 7671k(d), will apply this same process and standard and that all chemicals with similar characteristics, such as trichloroethylene, methylene chloride, HFE-7200 and HFC-365mfc will also be described in the same manner.

Therefore, at the very least, EPA should accurately describe the physical properties of nPB as it has for HFE-7200 and HFC-365mfc. However, in order to comply with equal protection, meet its published intention not to interfere in the marketplace, comply with its obligations under the NTTAA and act consistently with prior SNAP reviews, nPB should state that nPB is non-flammable according to all the applicable standards and regulations.

Dissemination of Unsupported Data that is Shown to Be Inaccurate is not Allowed under the Data Quality Act and Should Not be Used in the Consideration of a Federal Rule Making.

EPA discusses two points - MSDS still referring to nPB as flammable and commenters' assertions that nPB has a flashpoint - it considers "inconclusive about the flashpoint of nPB and whether nPB is likely to be flammable under normal use conditions".

This information likely comes from secondary sources which themselves offer no scientific support for the information, but merely state that "it has been reported that nPB has a flash point of X". We can find no MSDS or secondary source relied on by commenters which sets forth or even references *actual scientific or technical test data* supporting statements regarding the existence of a flash point for nPB. Thus, this information cannot be used to contradict the numerous flash point studies which show nPB to be non-flammable because it has no flash point.

²⁹ "Flammability testing by an independent laboratory has determined that SP34E as blended is not flammable. SP34E has no flash point." Federal Register / Vol. 65, No. 243 / Monday, December 18, 2000 (pg. 78979)

Describing this information as inconclusive is overly generous; it is, in fact, wholly inaccurate. Pursuant to the Data Quality Act, this information should be deleted from any further information dissemination by EPA on this matter. EPA should revisit, rely upon and cite the actual scientific and technical test data which it has on hand and unequivocally state, as it has for other similar compounds, that nPB is non-flammable.

Reports of Flash Point Test Showing a Flash Point Exists for nPB are Unreliable in that the Test Did Not Comply with Applicable Standards

EPA quotes an outdated UNEP report which states that “under certain test conditions, using standard flash point testing apparatus, pure nPB has demonstrated a flash point at -10C.” (UNEP, 1999). As we will discuss below, this statement in the UNEP is highly inaccurate.

The test mentioned in the UNEP article is likely to be the test performed by a team led by Dr. Brandes in Germany, since this is the only flash point tests which has ever been reported which concluded that nPB had a flash point.³⁰ As far as is known, this test used the ISO 1523 standard with a Pensky-Martens apparatus (closed cup) as described in ISO 2719 (1988) and found a flash point at -10 C.³¹ Interestingly, the report also apparently states that “with our own sample, we tried also other flash point methods (ISO 3689, DIN 51755, ISO 13736, ASTM 1310). We could, however, not get an ignition.” This is consistent with the UNEP statement.

Since this test was done using a standard approved for use in Europe, we will discuss it pursuant to European Union law. The test methods used for determining flammability are set forth in *Annex V of Directive 67/548/EEC. Annex V Part A: Methods for the Determination of the Physico-Chemical properties* sets forth A.9 *Flash Point* as applicable to liquid substances whose vapors can be ignited by ignition sources. NPB meets the definition of a liquid substance whose vapors can be ignited by ignition sources. Therefore, the methods set out in A.9 Flash Point are applicable to a flash point test involving nPB.

ISO 1523 is entitled *Paints, varnishes, petroleum and related products - Determination of flashpoint - Closed Cup equilibrium method. Section 1. Scope and*

³⁰ Stephen Rowe, Ph. D., CChem, MRSC, Chilworth Technology Limited *Flammability Classification of N Propyl Bromide* (2002) (Exhibit G) see also Rowe, S., Merritt, M. *Trichloroethylene, Dichloromethane and 1-bromopropane Vapour Flammability Testing*. Chilworth Technology Limited, Southampton, UK. March, 2002 (Exhibit H)

³¹ Id.

field of application of ISO 1523 lists solvents as a substance for which ISO 1523 specifies a method for determining a flash point. ISO 1523 is listed in *Section 1.6.3.1 Equilibrium Method of A.9 Flash Point* and therefore is an acceptable method for determining flash point and thus flammability under *Directive 67/548/EEC*.

Section 1.1 Introduction of A.9 Flash Point states “[t]he test methods listed in this text *are only reliable for flash point ranges which are specified in the individual methods*” [emphasis added]. *Section 1. Scope and field of application* states that ISO 1523 is “suitable for use over the temperature range of 5^b to 110^b C, although some of the apparatus in Annex A cannot cover all of this range using the thermometer supplied with the apparatus.” This is the only flash point range specified in ISO 1523. Thus, only flash points in the range of +5° to +110° C are *reliable*. The test announces the “discovery” of a flash point at -10° C for nPB. Obviously, that is outside the flash point range of +5° to +110° C as specified in ISO 1523. Therefore, by definition, under *Section 1.1 of A.9 Flash Point*, this conclusion is *not reliable*.

Further, Paragraph 24, states that some of the test methods set forth in Annex V “may not be suitable in certain circumstances, as they can give widely differing results.” Thus, suitability is determined in terms of results consistent with other test methods. Tests done by the same laboratory according to the ISO 3689, DIN 51755, ISO 13736 and ASTM 1310 (all of which are set out in Annex V) give consistent results of no flash point³². The unreliable ISO 1523 test is the *only test that found a flash point* and is *therefore the only test that found “widely differing results”*. The widely different results obtained are therefore *not suitable* to use under the guidance of Paragraph 24.

Paragraph 24 also states that: “care should be taken ... to apply the most appropriate test method to the particular substance ... being tested.” The guidance here makes it clear that results from the flawed ISO 1523 test procedure - which is neither *reliable* per *Section 1.1 of A.9 Flash Point* nor *suitable* under Paragraph 24 - is *not an appropriate test*.

Yet another inconsistency plagues this study. It is well known that the Pensky-Marten ISO 2719 apparatus is valid for a temperature range of +10° to +110° C. In fact, this information is reflected in Table 1 to the updated draft of international standard ISO.DIS 1523 dated 2000. However, the flash point was observed using ISO 1523 “with a Pensky-Martens apparatus (closed-cup) as described in ISO 2719 (1988) at -10 C” Thus, *improper equipment* was used while testing outside the flash point ranges specified by the standard.

32

Id.

Therefore, under the European Union legal standard, nPB cannot be found to be flammable, especially where it is abundantly clear that the test itself was not in compliance with the specified standard. The guidance here is clear that the results from this procedure are fatally flawed even before the test was conducted because the study protocol, which is neither *reliable* per *Section 1.1 of A.9 Flash Point* nor *suitable* under Paragraph 24, is *not an appropriate test*.

In order to show how useless the information in this study truly is, Enviro Tech's European subsidiary contracted with Chillworth Laboratories of Southampton (UK) to test trichloroethylene, methylene chloride and three different HFE/1,2 trans dichloroethylene mixtures using this flawed protocol. (Exhibit H). As shown below, in all five cases, these substances exhibited flash points below 0° C.

TCE	+24.0° C
methylene Chloride	- 5.5° C
HFE 72 DE	- 9.0° C
HFE 71 DE	- 16.0° C
HFE 71 DA	- 14.0° C

What is gained from this seriously flawed methodology? The knowledge that as expected, compounds with similar characteristics tend to act similarly, and that under this flawed protocol, compounds which EPA has deemed to be and recommended as non-flammable would now be treated as flammable.

Therefore, the UNEP report that nPB has demonstrated a flash point at -10 C is not "inconclusive, it is just plain wrong. This "report" then, should receive no consideration in subsequent EPA' review of nPB regarding flammability characteristics. The publication of unsupported and inaccurate scientific information, as was done here by EPA, violates both the letter and the spirit of the Data Quality Act. Therefore, EPA should delete all references to this report and stop all dissemination of material that includes this erroneous information.

Stabilized nPB Solvents have been Shown to be Non-Flammable Under the Applicable OSHA and DOT Regulations, and this Data Is a More Practical and Useful Measure of Worker Safety.

In addition, at EPA's request, Enviro Tech supplied EPA with the following reports regarding the flammability of EnSolv, Enviro Tech's stabilized nPB product, all of which found no flash point:

- 1) Anacom Laboratories dated February 27, 1996 using ASTM 93 (Exhibit I)

- 2) Scientific Control Laboratories, Inc. dated December 6, 1996 using ASTM D93 and ASTM D56 (Exhibit J)
- 3) Factory Mutual report dated July 14, 1997. (Exhibit K)

Although EPA states it is *now* interested only in the flammability of “pure” nPB, EPA was interested in the flammability characteristics of stabilized nPB when it requested this information in 1996 and 1997. Further, this data is extremely relevant since EPA is interested in whether or not nPB is likely to be flammable under *normal use conditions*. As EPA knows, “pure”, unstabilized nPB is of little or no commercial use in the use sectors EPA has identified in the NPR. Thus, the flammability characteristics of stabilized nPB, such as EnSolv, is more practical and useful data pertaining to worker safety. Thus, if in fact EPA can lawfully consider the characteristic of flammability pursuant to a review under SNAP, EPA should consider this relevant data.

Conclusion

Based on the above, EPA should add n propyl bromide to the list of approved substitutes for CFC-113, methyl chloroform and HCFC-141b in the metal cleaning, electronics cleaning, precision cleaning and aerosol sectors without restrictions based on flammability concerns. Since all relevant scientific and technical data show nPB has no flash point and is thus by definition non-flammable, EPA should state so unequivocally as is consistent with prior EPA SNAP actions.

Enviro Tech hereby submits these comments and the following documents attached hereto, which are incorporated by reference as if set forth in whole herein, for consideration as a Public Comment to be placed in Docket OAR 2002 0064 in response to the request for comments published in the Notice of Proposed Rulemaking concerning n propyl bromide in the Federal Register Vol. 68 No. 106, June 3, 2003.

ATTACHMENTS

- Exhibit A ASTM D56 flash point test conducted by United States Testing Company dated June 13, 1995. Included as Attachment III in Petition for SNAP approval of 1-bromopropane by Albemarle Corp. (A-91-42, VI-D-114). EPA should refer⁴nce the complete study, as copies have been disseminated with information deleted pursuant to a request for CBI.
- Exhibit B *Tabulation of Flammability Studies on n propyl bromide* from Brominated Solvents Committee Docket A-2001-07 Doc. A-2001-07 II-D-45

- Exhibit C Laboratory Report from TEI Analytical, Inc. Flashpoint test for 1-Bromopropane dated December 18, 1995. Included in the SNAP petition of Enviro Tech International, Inc. Dated January, 1996. (A-91-42, VI-D-138)
- Exhibit D Letters from Hana Silberberg, Dead Sea Bromine Group, re: Harmonization of International; Transportation Regulations. January and February, 2002.
- Exhibit E 3M Novec Engineered Fluid HFE-7100 Product Information Sheet. October, 2000
- Exhibit F 3M MSDS HFE 7200 November 1, 2000
- Exhibit G Stephen Rowe, Ph. D., CChem, MRSC, Chilworth Technology Limited *Flammability Classification of N Propyl Bromide* (2002)
- Exhibit H a) Rowe, S., Merritt, M. *Trichloroethylene, Dichloromethane and 1-bromopropane Vapour Flammability Testing*. Chilworth Technology Limited, Southampton, UK. March, 2002;
This document includes flash point and flammability limit test data for nPB, TCE and methylene chloride. It is presented here as a response to EPA's request for information regarding the flash point of nPB. It is also presented for the purpose of comparison of nPB to other halogenated compounds which have been SNAP approved and which SNAP recommends where non-flammability is critical. Finally, this report also discusses why the method used in the test by Dr. Elizabeth Brandes discussed above is unreliable and invalid.
- a) Rowe, S., Merritt, M. *Flash Point Testing of HFE-72DE, HFE-71DE and HFE-71DA Samples* Chilworth Technology Limited, Southampton, UK. May, 2002.
- This report is presented for the purpose of comparison of nPB to chemical mixtures of SNAP approved compounds which are marketed as non-flammable. this report also discusses why the method used in the test by Dr. Elizabeth Brandes discussed above is unreliable and invalid.
- Exhibit I Anacom Laboratories flash point test results for EnSolv stabilized nPB solvent dated February 27, 1996 using ASTM 93

- Exhibit J Scientific Control Laboratories, Inc. flash point test results for **EnSolv** stabilized nPB based solvent dated December 6, 1996 using ASTM D93, ASTM D92 and ASTM D56
- Exhibit K Factory Mutual report flash point test results for EnSolv stabilized nPB based solvent dated July 14, 1997.
- Exhibit L Table A.1.7.3 from NFPA 704.
- Exhibit M Kehren, J. *A Comparison of Hydroflouroether and Other Alternative Solvent Cleaning Systems*. 3M Company St. Paul, MN. Datatech pg 53 - 56. Table 3 references the flammability and flammable limits of various chemical compounds., showing that the chemicals which show determinable flammable limits but no flash point are considered non-flammable.

Cordially,

A handwritten signature in black ink, appearing to read "Richard G. Morford", with a stylized, flowing script.

Richard G. Morford
General Counsel